

Image Analogies

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Analogies



Image analogies



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Image analogies



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Image analogies



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Motivation

Design *by example*

One mechanism, many filters

Problems

No unique transformation

**What aspects of the images
are important?**

Applications

Texture synthesis

Applications

Texture synthesis

Superresolution

Applications

Texture synthesis

Superresolution

Texture transfer

Applications

Texture synthesis

Superresolution

Texture transfer

Artistic filters

Applications

Texture synthesis

Superresolution

Texture transfer

Artistic filters

Texture-by-numbers

Related work

Machine learning for graphics

Related work

Machine learning for graphics

Texture synthesis and transfer

Related work

Machine learning for graphics

Texture synthesis and transfer

Non-photorealistic rendering

Related work

Machine learning for graphics

Texture synthesis

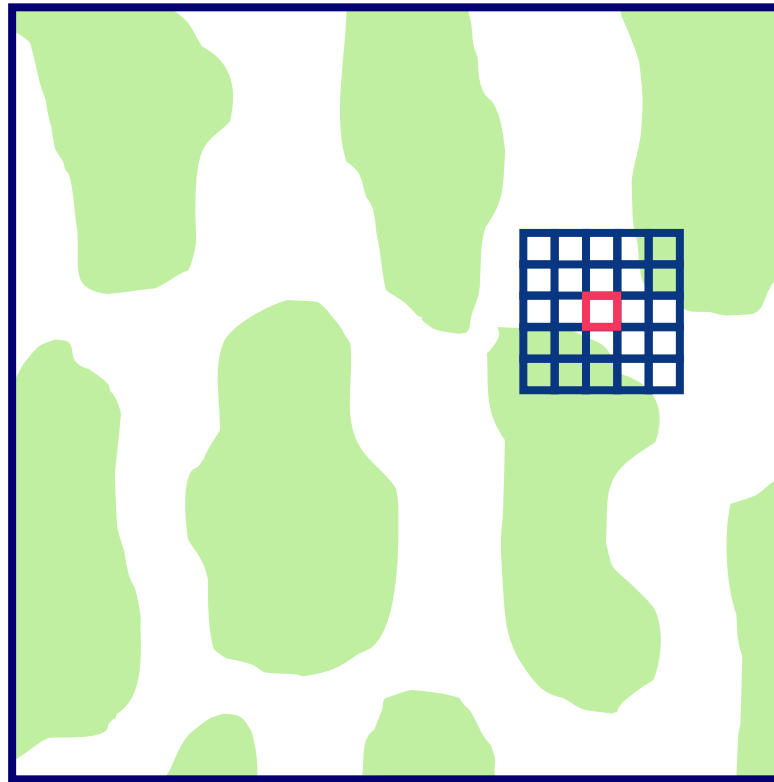
Non-photorealistic rendering

Example-based NPR

Algorithm

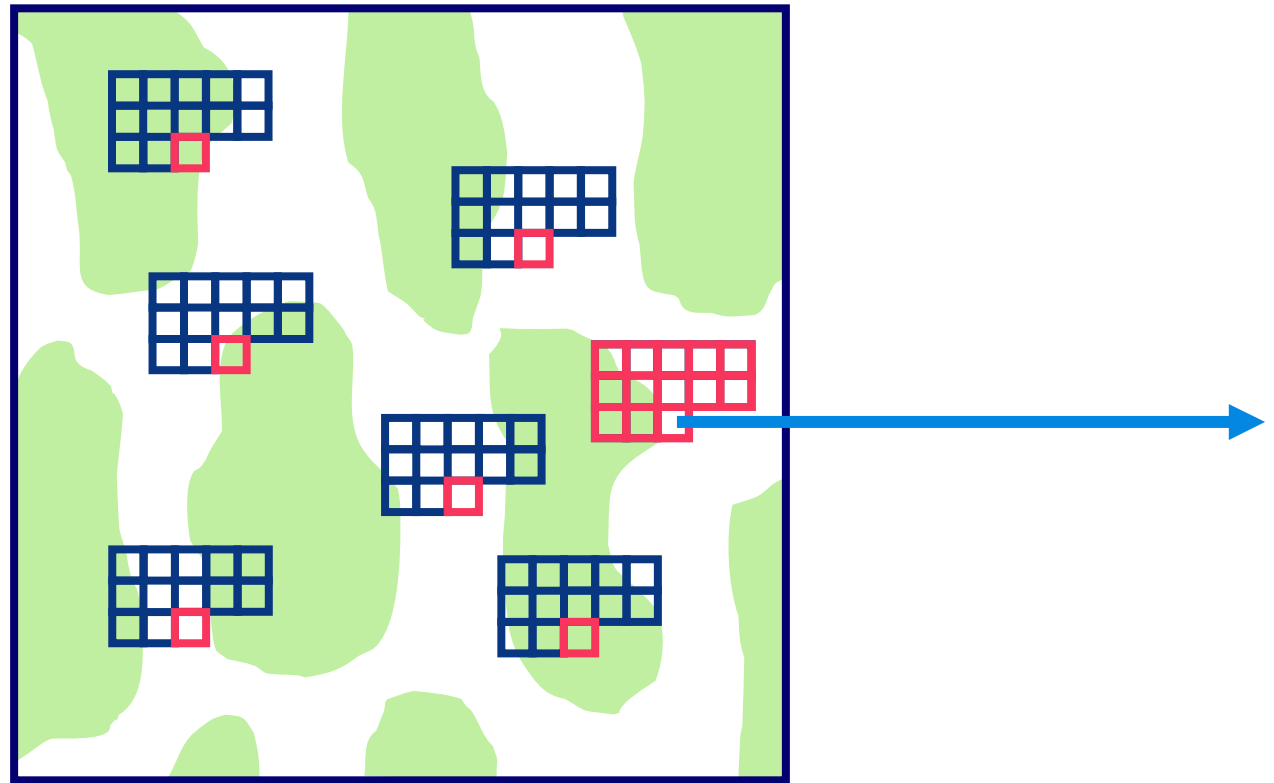
Texture synthesis

Goal: Match image statistics



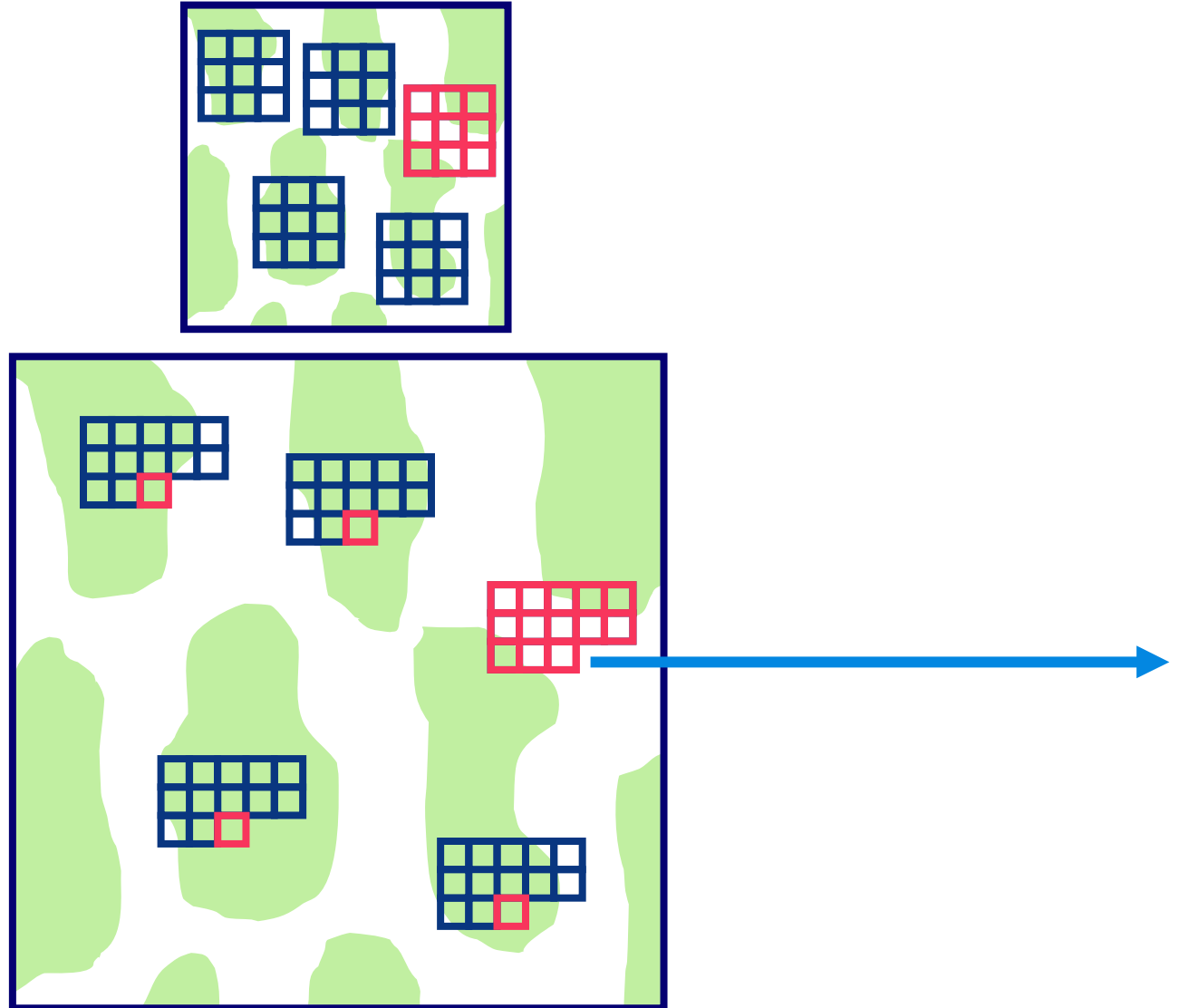
Input texture

Texture synthesis (Efros 99)



Input texture

Multiscale synthesis (Wei 00)

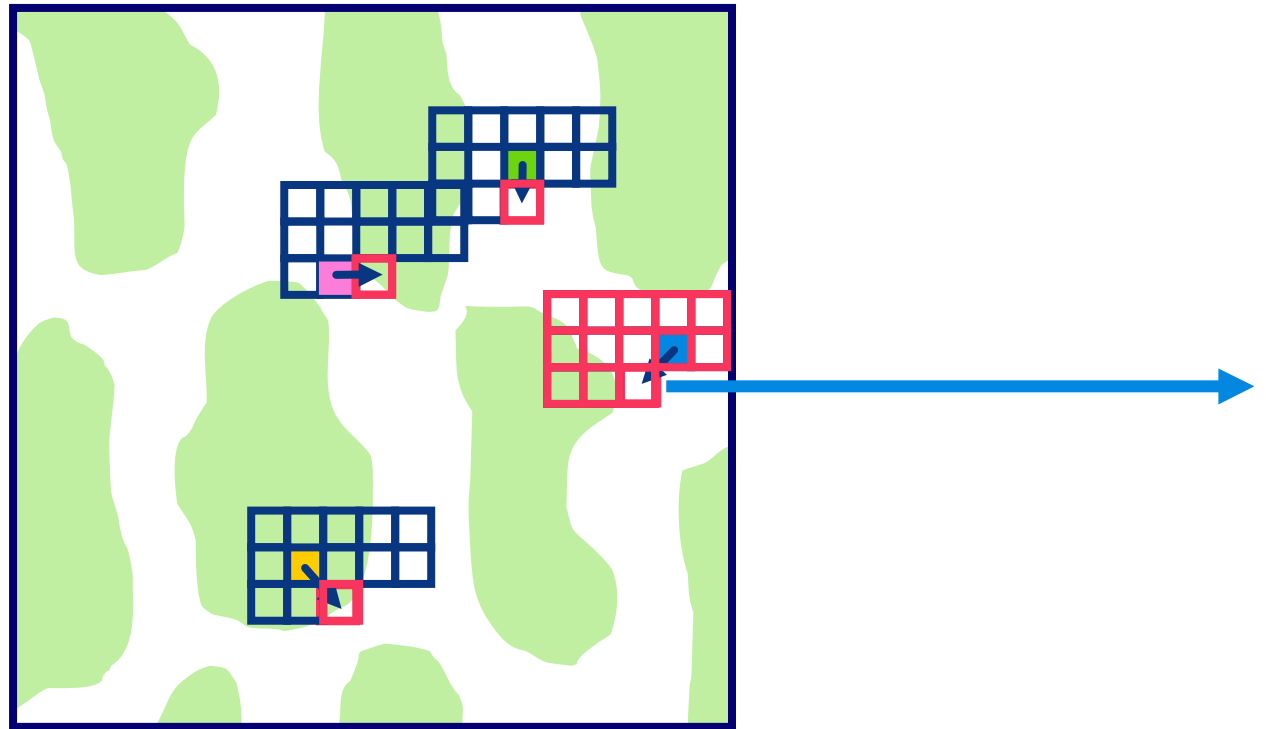


Multiscale synthesis



Input texture

Coherent synthesis (Ashikhmin 01)



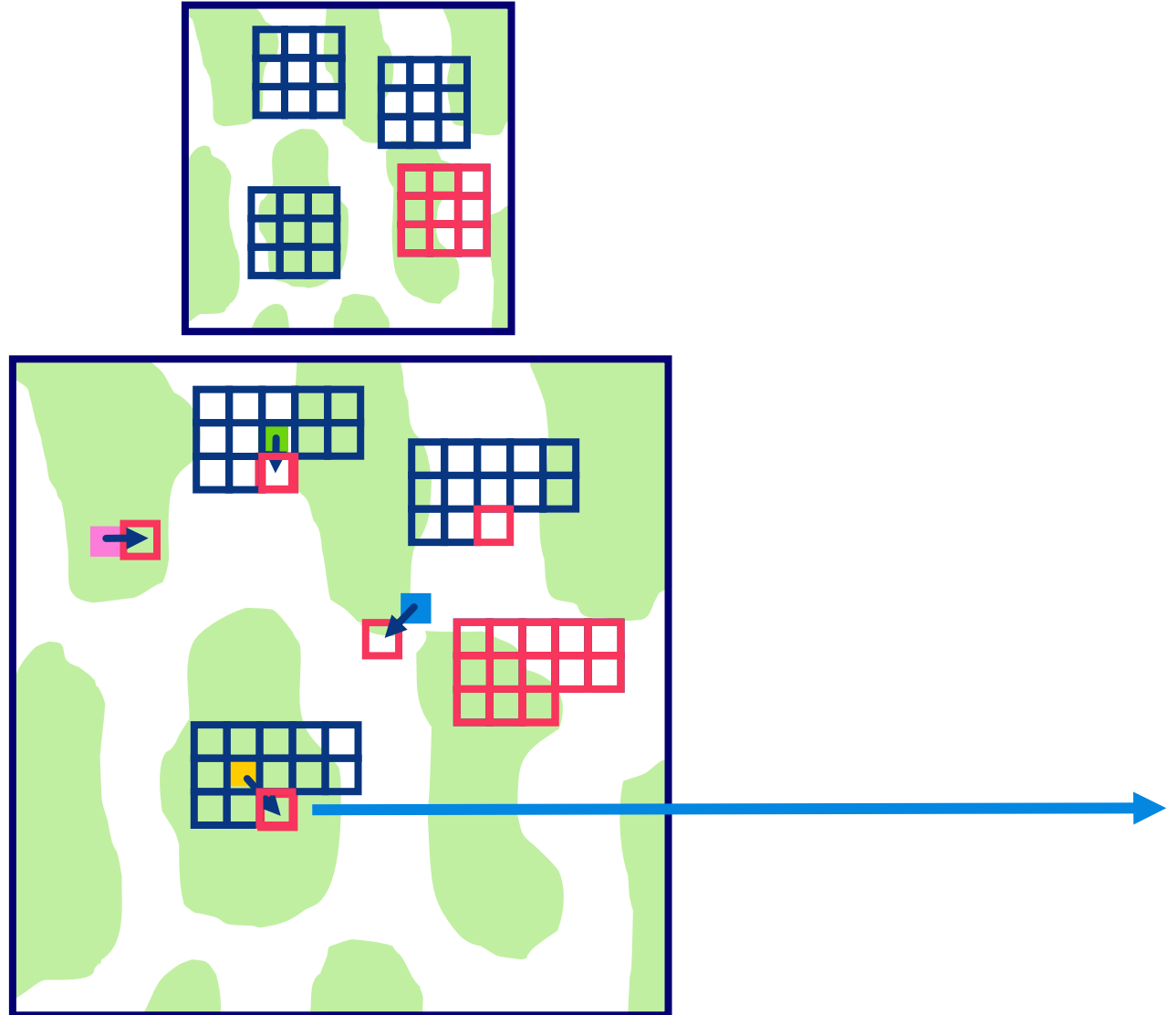
Input texture

Coherent synthesis



Input texture

New, hybrid algorithm



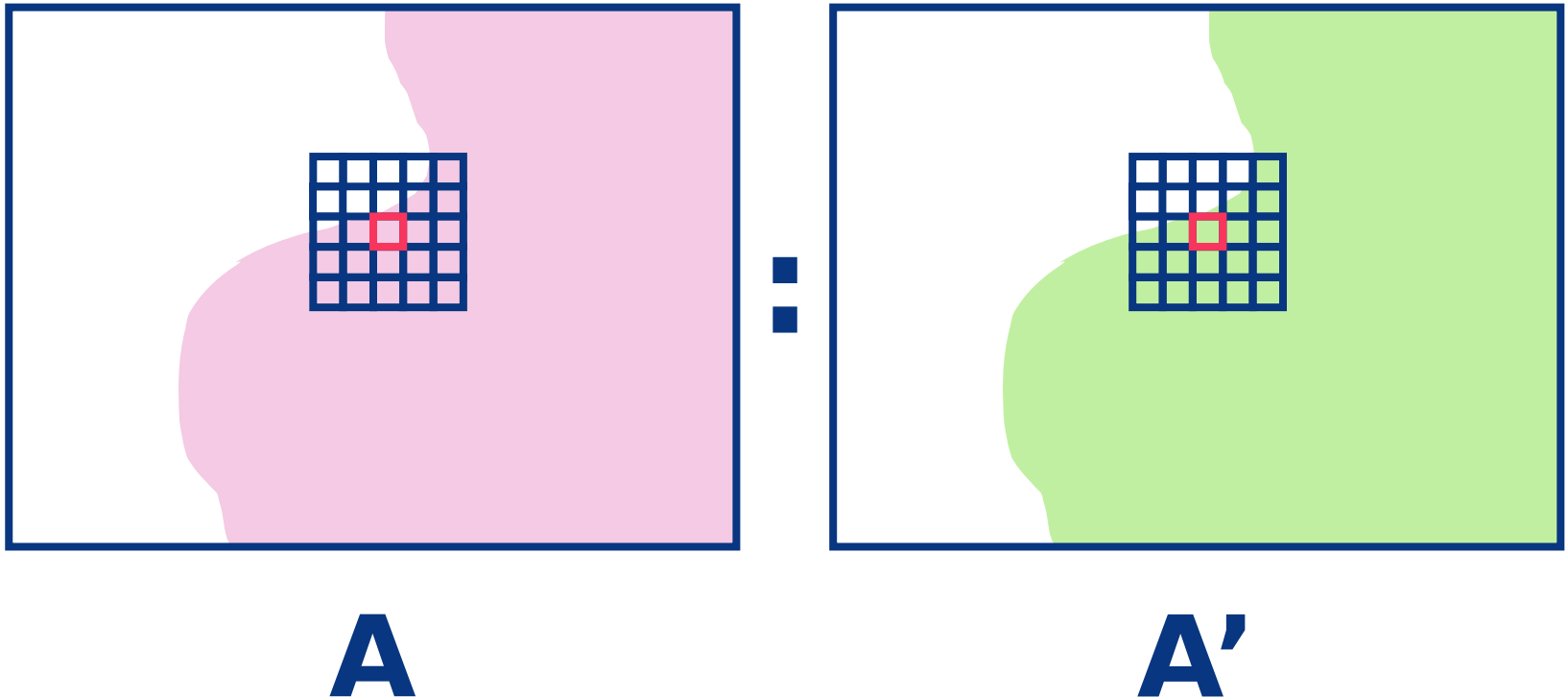
Combined algorithm



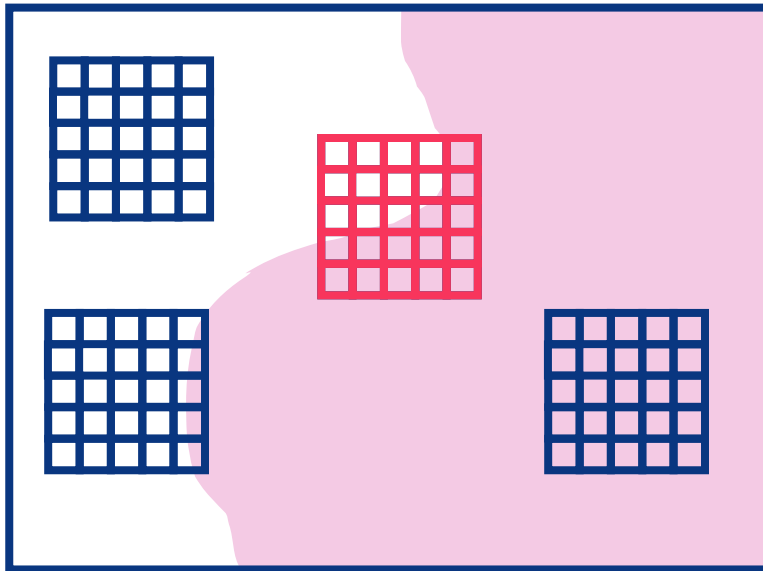
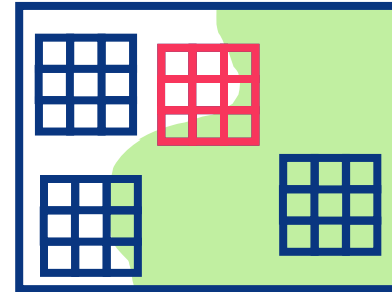
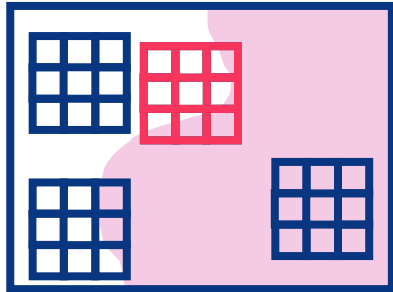
Input texture

Image analogies

Goal: Match *joint* image statistics

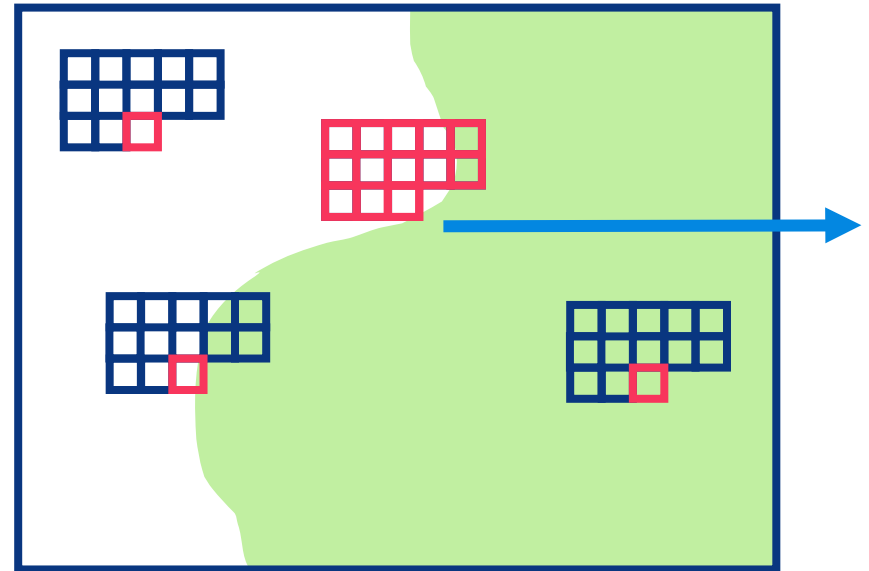


Hybrid synthesis



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Feature vectors



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Feature vectors



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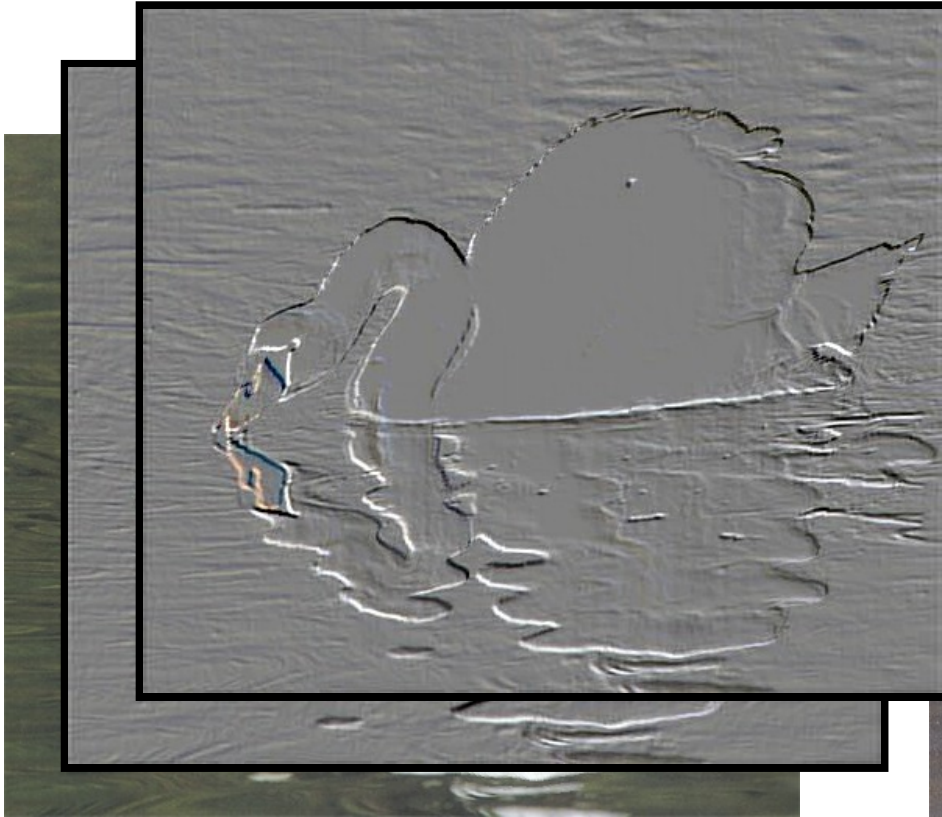
Color

Combine new luminance with source color B

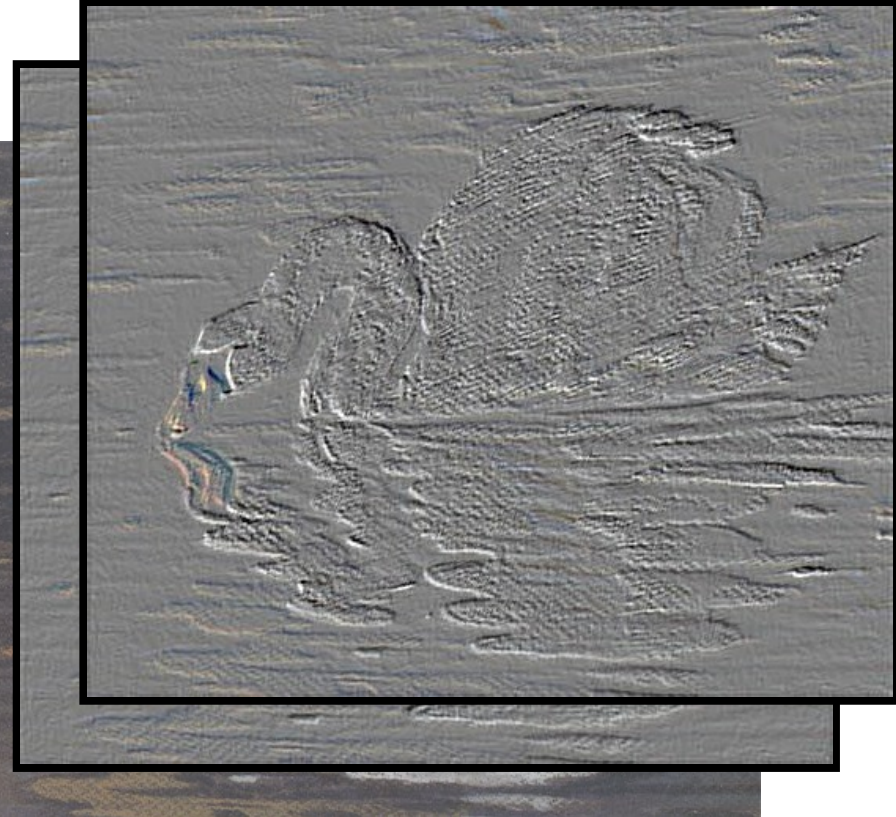


B' (Final)

Feature vectors



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Applications

Superresolution



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Texture transfer



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Texture transfer



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Pen-and-ink



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Pen-and-ink



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Stippling



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Stippling



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Pastel



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Pastel



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Oil



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From *Still life with Melon and Peaches*, Edouard Manet, 1866



Oil



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From *Starry Night over the Rhône*, by Vincent Van Gogh , 1888

Oil



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From *Starry Night over the Rhône*, by Vincent Van Gogh , 1888

Watercolor



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From (Curtis 97)

Watercolor



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From (Curtis 97)

Texture-by-numbers



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Texture-by-numbers



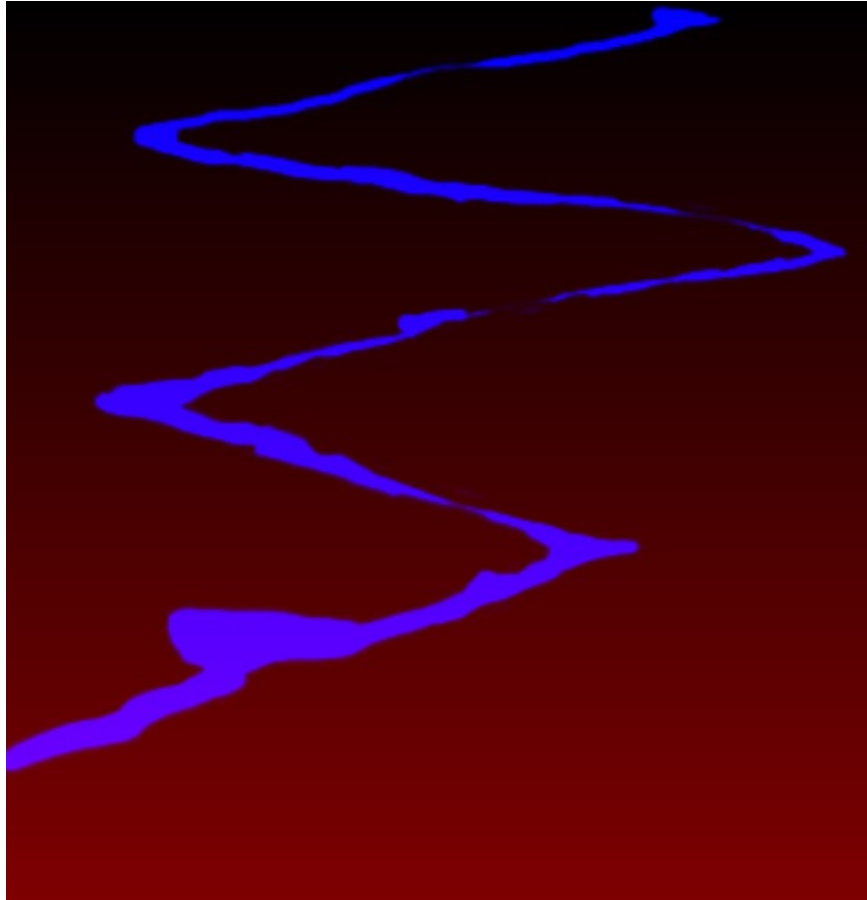
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Texture-by-numbers



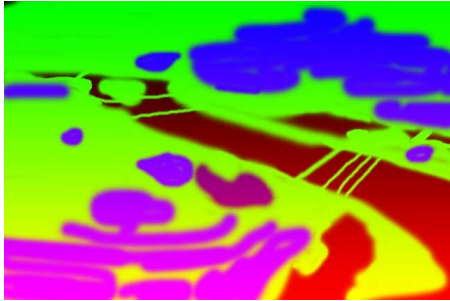
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Texture-by-numbers



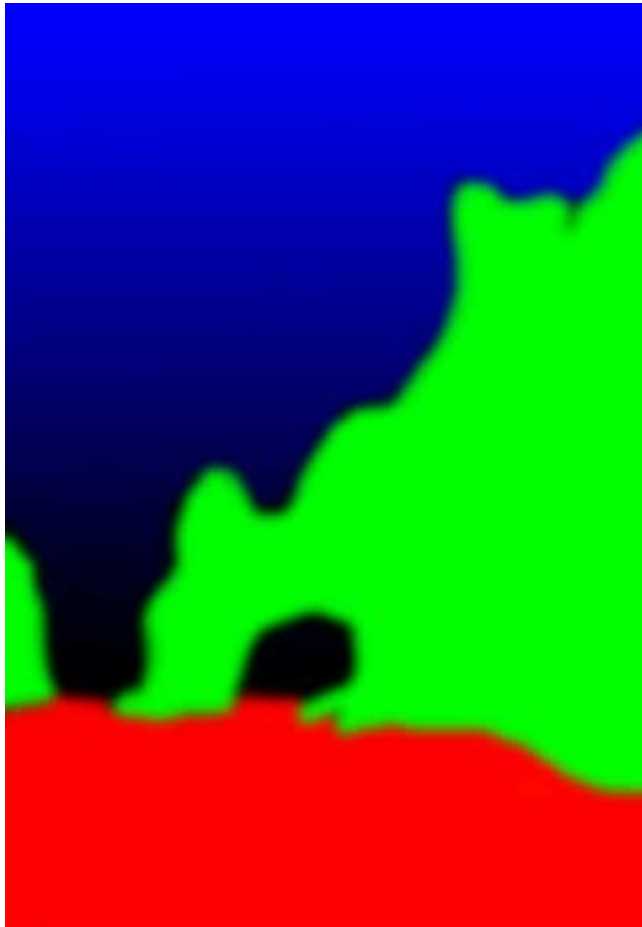
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Interactive editor



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Future work

Algorithms

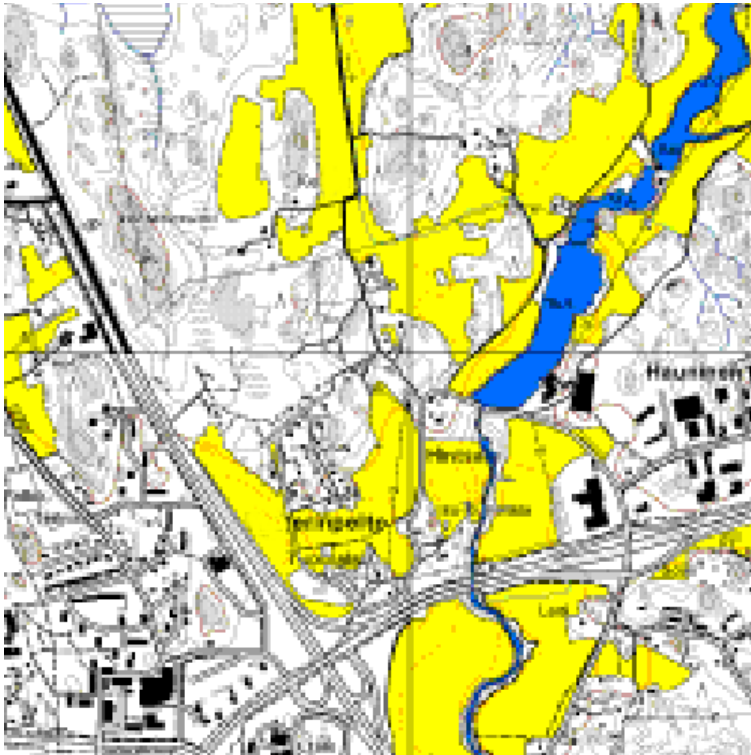
- Better color space matching
- Faster synthesis
- Better regression

Applications

- Video, 3D, animation, ...

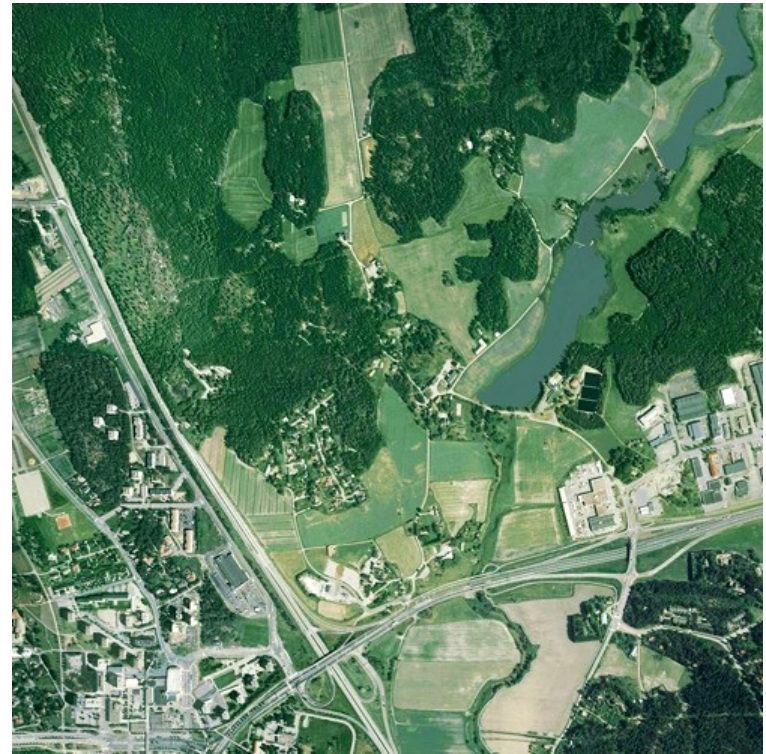
Flight simulator terrain

by Jari Kaskelin (jari.kaskelin@luukku.com)



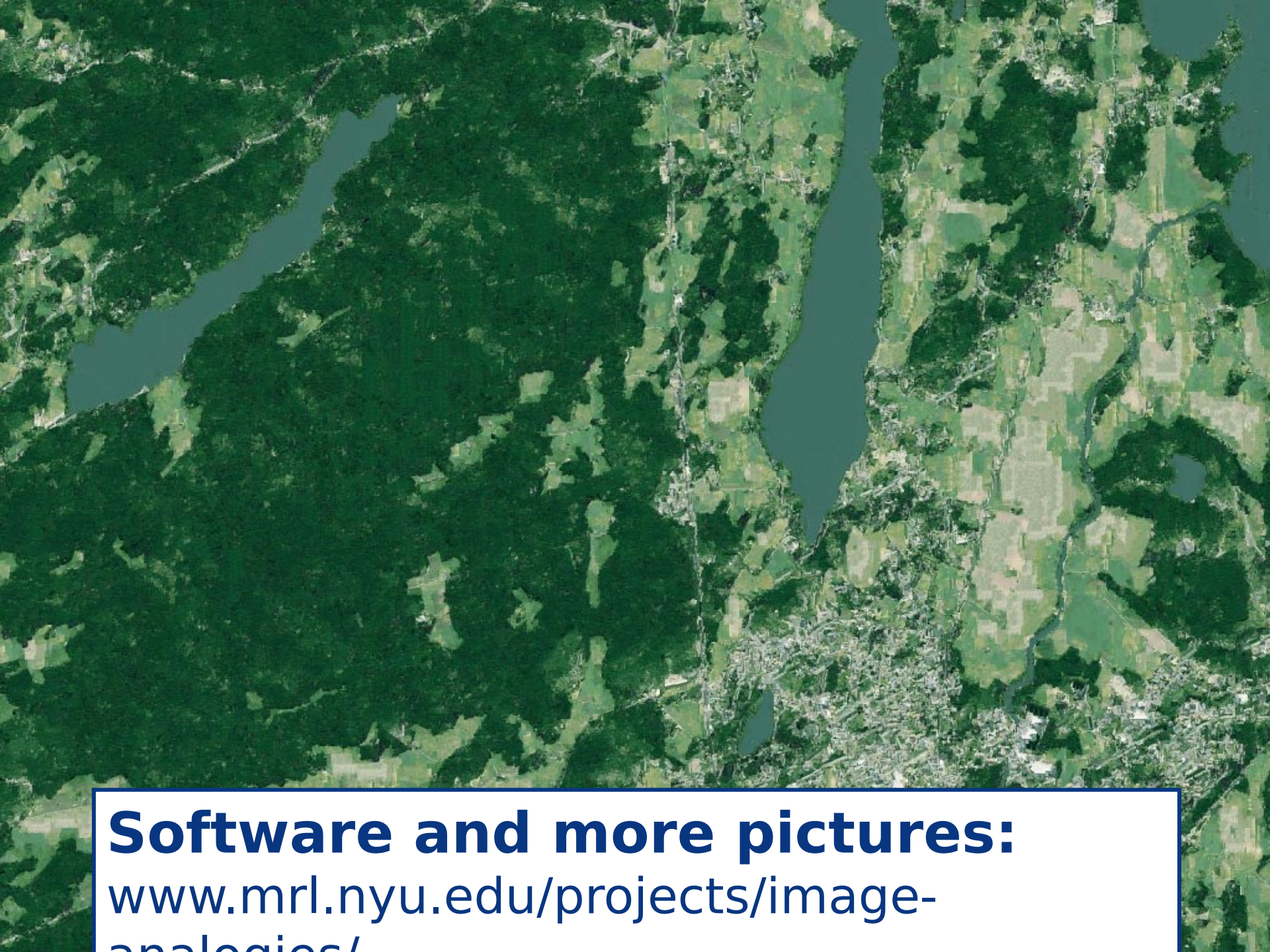
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(from Nat'l Land Survey of Finland)



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(from Turku city website)



Software and more pictures:

www.mrl.nyu.edu/projects/image-analogies/